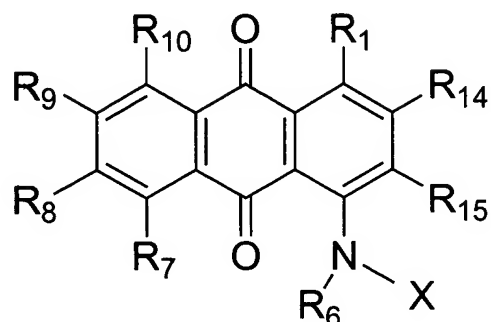


WHAT IS CLAIMED IS:

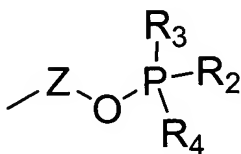
1. A chemical composition comprising the anthraquinone composition of formula (1):



(1)

wherein the groups R₇, R₈, R₉, and R₁₀ independently comprise hydrogen or an electron withdrawing group; the groups R₁, R₁₄, and R₁₅ independently comprise hydrogen or electron donating groups; R₆ comprises a group other than acetyl that can covalently bind to nitrogen; X comprises a solid support, a biologically relevant molecule, or a linking group for attaching the composition to another molecule.

2. The composition of claim 1 wherein X comprises a chemical composition of formula (2)



(2)

wherein Z comprises a linking group or bond with the anthraquinone; R₂, R₃, and R₄ independently comprise an electron pair, linker, oxygen, hydrogen, sulfur, alkyl, alkynyl, alkenyl, aryl, heteroaryl, cycloalkyl, heteroalkyl, alkoxy, carbonyl, carbamoyl, alkylaryl, heteroalkoxy, or -NR₁₁R₁₂ or -OR₁₃, wherein not more than one of R₂, R₃, and R₄ is an electron

pair and R₁₁, R₁₂, and R₁₃; independently comprise a hydrogen, alkyl, alkynyl, alkenyl, aryl, heteroaryl, cycloalkyl, heteroalkyl, alkoxy, alkoxy carbonyl, carbonyl, carbamoyl, alkylaryl, or heteroalkyl group.

3. The composition of claim 1 further comprising a substance linked to the compound of formula (1) selected from the group consisting of an antigen, a steroid, a vitamin, a drug, a hapten, a metabolite, a toxin, an environmental pollutant, an amino acid, a protein, a nucleoside or nucleotide, an oligonucleotide, a nucleic acid polymer, a carbohydrate, a solid support, a linker, or a lipid.

4. The composition of claim 3 wherein the substance linked to the compound of formula (1) further comprises a fluorophore.

5. The composition of claim 3 wherein the compound of formula (1) further comprises a phosphoramidite group.

6. The composition of claim 3 wherein the substance linked to the compound of formula (1) group further comprises an oligonucleotide.

7. The composition of claim 6 wherein the compound of formula (1) comprises a link to the 3'-terminus of the oligonucleotide.

8. The composition of claim 6 wherein the compound of formula (1) comprises a link to the 5'-terminus of the oligonucleotide.

9. The composition of claim 3 wherein the substance linked to the compound of formula (1) comprises a solid support that is suitable for oligonucleotide synthesis.

10. The composition of claim 1 wherein R₁ is aniline.

11. The composition of claim 1 wherein R₇, R₈, R₉, and R₁₀ are hydrogen.

12. The composition of claim 1 wherein R₇, R₈, R₉, and R₁₀ comprise electron withdrawing groups.

13. The composition of claim 12 wherein the electron withdrawing groups are independently selected from the group consisting of nitro, cyano, carboxylate, sulfonyl, sulfamoyl, alkenyl, alkynyl, aryl, heteroaryl, alkylaryl, alkoxycarbonyl, and carbamoyl mono- and di-substituted amine groups.

14. The composition of claim 1 wherein R_1 , R_{14} , R_{15} are hydrogen.

15. The composition of claim 1 wherein R_1 , R_{14} , R_{15} comprise electron donating groups.

16. The composition of claim 15 wherein the electron donating groups are independently selected from the group consisting of alkoxy, alkyl, alkylamine, arylamine, cycloalkyl, heteroalkoxy, and heteroalkyl groups.

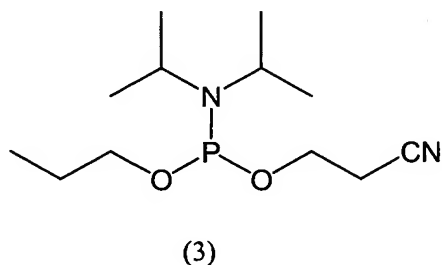
17. The composition of claim 2 wherein Z is selected from the group consisting of alkyl, alkynyl, alkenyl, aryl, heteroaryl, cycloalkyl, heteroalkyl, sulfonyl, sulfamoyl, carbonyl, carbamoyl, alkylaryl, or heteroalkoxy group.

18. The composition of claim 2 wherein Z comprises an alkyl group.

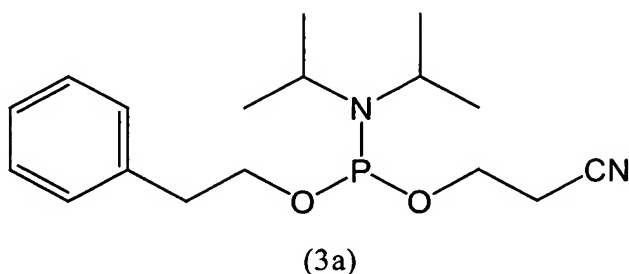
19. The composition of claim 2 wherein Z comprises an ethyl group.

20. The composition of claim 2 wherein at least one of R_2 , R_3 , and R_4 , comprise a cyanoethoxy group.

21. The composition of claim 2 wherein X comprises the chemical composition of formula (3):



22. The composition of claim 2 wherein X comprises the chemical composition of formula (3a):



23. A composition comprising a dye pair comprising a fluorescent dye and a chemical composition of claim 1 having the structure of formula (1) wherein the composition quenches the fluorescence of the fluorescent dye by about 50% or more.

24. A composition comprising the dye pair of claim 23 wherein the composition quenches the fluorescence of the fluorescent dye by about 70% or more.

25. A composition comprising the dye pair of claim 24 wherein the composition quenches the fluorescence of the fluorescent dye by about 80% or more.

26. A composition comprising the dye pair of claim 25 wherein the composition quenches the fluorescence of the fluorescent dye by about 90% or more.

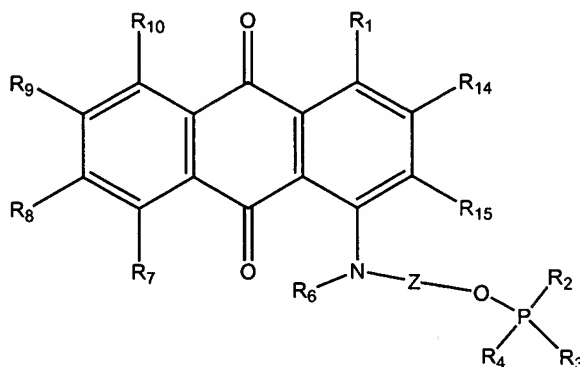
27. A composition comprising the dye pair of claim 26 wherein the composition quenches the fluorescence of the fluorescent dye by about 95% or more.

28. A composition comprising the dye pair of claim 27 wherein the composition quenches the fluorescence of the fluorescent dye by about 98% or more.

29. A kit comprising a container comprising a composition of claim 1 and instructions for its use.

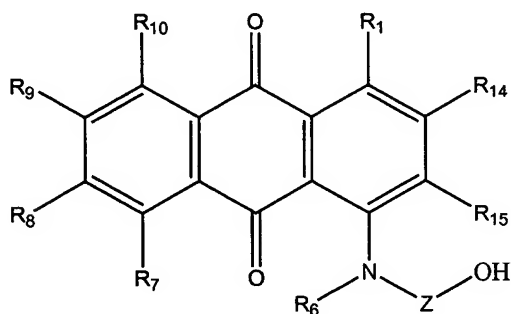
30. A method for hybridizing nucleic acid polymers comprising :
- a) incubating a first nucleic acid polymer with a second nucleic acid polymer comprising a quencher composition of formula (1), wherein at least one of the two nucleic acid primers comprises a fluorophore with fluorescence that can be quenched by the quencher composition of formula (1), and
 - b) measuring the fluorescence of the first and second nucleic acid polymer.
31. A method in accordance with claim 30 further comprising altering the spatial relationship between the fluorophore and quencher.
32. The method in accordance with claim 30 wherein the altering of the spatial relationship between the fluorophore and quencher is a result of hybridization of the first and second nucleic acid polymers.
33. The method of claim 30 wherein the fluorophore and quencher composition are linked to a single nucleic acid polymer.
34. The method of claim 30 further comprising hybridizing the first and second nucleic acid polymers to each other and releasing a fluorophore or quencher composition from the hybridized structure.

35. A method for preparing the composition of formula (7) comprising:

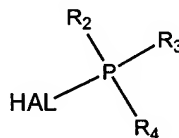


(7)

a) contacting a compound of formula (5) with a compound of formula (6) under conditions such that the halide ion (HAL) of the composition of formula (6) is displaced by the hydroxyl group of the composition of formula (5), and



(5)



(6)

b) isolating the composition of formula (7),

wherein the groups R₇, R₈, R₉, and R₁₀ are the same or different and are hydrogen or an electron withdrawing group; the groups R₁, R₁₄, and R₁₅ are the same or different and can be hydrogen or electron donating groups; R₆ is any group other than acetyl that can covalently bind to the nitrogen; and R₂, R₃, and R₄ are independently an electron pair, linker, oxygen, hydrogen, sulfur, alkyl, alkynyl, alkenyl, aryl, heteroaryl, cycloalkyl, heteroalkyl, alkoxy, carbonyl, carbamoyl, alkylaryl, heteroalkoxy, or -NR₁₁R₁₂ or -OR₁₃, wherein not more than one of R₂, R₃, and R₄ is an electron pair and R₁₁, R₁₂, and R₁₃ are independently a hydrogen, alkyl, alkynyl, alkenyl, aryl, heteroaryl, cycloalkyl, heteroalkyl, alkoxy, alkoxycarbonyl, carbonyl, carbamoyl, alkylaryl, heteroalkyl groups.

36. A method for preparing the composition of formula (7) comprising:
- a) contacting a compound of formula (5) with β -cyanoethyl N,N,N',N'-tetraisopropylphosphorodiamidite, and
 - b) isolating the composition of formula (7).